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DISCUSSION

LAWRENCE CHAFFIN, M.D. (1136 West Sixth Street, Los Angeles).—The value of adequate preoperative medication cannot be overestimated. The demand for more satisfactory preoperative medication in all types of surgery has been answered during the past five years by the general use of the barbiturates. Experience has clearly proved that preoperative barbiturates, in addition to the usual morphin and scopolamin, are of definite practical value, and for the following reasons:

1. Fear is so completely eliminated that many patients do not remember having had their operation.
2. The safety of spinal anesthesia is materially increased.
3. The amount of general anesthesia required is definitely lessened.
4. All types of anesthesia are taken smoothly and without effort.

I have found the procedure outlined by Doctor Doyle to be efficient and satisfactory in all respects. I would, however, suggest caution in the dosage of barbiturates for those past sixty, and for those patients who have had a prolonged illness. It has been my experience, likewise, that not infrequently children under three years of age are rather sensitive to nembutal, and require careful dosage.

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H. N. SHAW, M.D. (901 Pacific Mutual Building, Los Angeles).—This paper emphasizes a very important point: the necessity for close coöperation between the anesthetist and the surgeon.

A careful study of the patient by the anesthetist, with suggestions as to the type of anesthetic, takes quite a load from the surgeon's mind.

Among our surgical patients, a good number had previous operations before proper attention was paid to the preoperative medication. These individuals never fail to express their appreciation of its value. As the author points out, the strain which the patient undergoes before the ordeal of surgery may be a considerable factor in a delayed convalescence.

In 1908 I was operated for an empyema. As far as I was concerned, that rib resection was the most important operation that had been performed anywhere for several years. I can never forget the trip to the operating room, through walls redolent of iodoform. A crowning humiliation was to hear one of three or four white-clad figures say, "Here's the next case, who's going to put him on the table?"

A surgeon, who has recently returned from a tour of the large eastern clinics, told me that in many of them they pay very little attention to surgical premedication. It is, however, an extremely important part of the surgical procedure, and I wish to compliment the author on his very clear presentation of the subject.

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MARY E. BOTSFORD, M.D. (807 Francisco Street, San Francisco).—This timely paper is on a subject that, for some years past, needed to be brought to the attention of the medical profession. The routine administration of morphin and atropin militates against the best results, pre-operatively and postoperatively, with a large percentage of patients.

The psychologic factor is of the utmost importance in the adult patient and, as Doctor Doyle points out, doubly so in children, as the sights and sounds of transportation to, and a possible long period of waiting in, the surgery

may produce a psychic response which has been known to lead to a complex lasting for years. The addition of the barbiturates and tribromethanol to the previously known narcotics, such as the opium derivatives and scopolamin, have helped immeasurably in providing an escape from the depressing effect of fear, and in bringing the patient to the operating table in the best possible physiologic and psychologic condition.

The selection and combination of hypnotics and anesthetics must vary with the individual condition.

The use of atropin in combination with morphin was based on the tradition which still maintains, that being the physiologic antagonist of morphin, it provides a safety factor. It stimulates respiration, accelerates the heart, and increases the metabolic rate. This respiratory action is a disadvantage in modern gas anesthesia, and now that carbon dioxide is available in all well-equipped operating rooms, respiratory depression can be immediately overcome.

All of the arguments of the psychic and physiologic values of the methods advocated in this paper for inhalation anesthesia have double force as to their use with subarachnoid. Finally, the barbiturates have been proved to decrease the toxicity of the cocain derivatives.

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ELMER BELT, M.D. (1893 Wilshire Boulevard, Los Angeles).—Dr. James Doyle is to be commended for his vigorous and pleasing style of writing, as well as the presentation of a very usable plan of surgical premedication. With the magic of the phenobarbital group of drugs at hand, there remains little excuse for permitting the occurrence of preoperative terrors and fatiguing worry. I vividly recall an old gentleman driven to seek surgical help because of severe urinary hemorrhage. Fear of his hemorrhage outweighed his fear of surgery. Entering the hospital late at night, he refused all medication and suddenly fled when an orderly came in to shave his pubes. The next day another hemorrhage occurred. He reentered the hospital, still vowing that he would not be drugged. He permitted the nurse to give him an enema and thus received nembutal by rectum. When he awakened, the papilloma, which had caused his trouble, had been removed. He is now friendly to hospitals and laughs at his former fears.

Doctor Doyle fails to mention a powerful factor in his success as an anesthetist. This is his custom of visiting and examining the patient on the day before surgery. This contact is comforting and reassuring to the patient. It gives him an opportunity to express his fears and have fear replaced by a rational understanding of the manner in which a scientific man is prepared to meet for him the problem of anesthesia.

URETERAL CALCULI*

By DOZIER H. GIBBS, M.D.
Los Angeles

DISCUSSION by Burnett Wright, M.D., Los Angeles;
A. A. Kutzmann, M.D., Los Angeles; Lionel P. Player,
M.D., San Francisco.

AS this paper deals with the practical management of ureteral calculi, the question of etiology of urinary lithiasis will be only briefly mentioned.

ETIOLOGY

The primary cause is unknown, and it remains for the physical chemists to solve the problem. When they discover the cause of the disturbed colloid crystalloid balance, the question will be nearer a solution. Urinary stasis; infections, local and focal; disturbances of metabolism, especially calcium; vitamin A deficiency; trauma of the kid-

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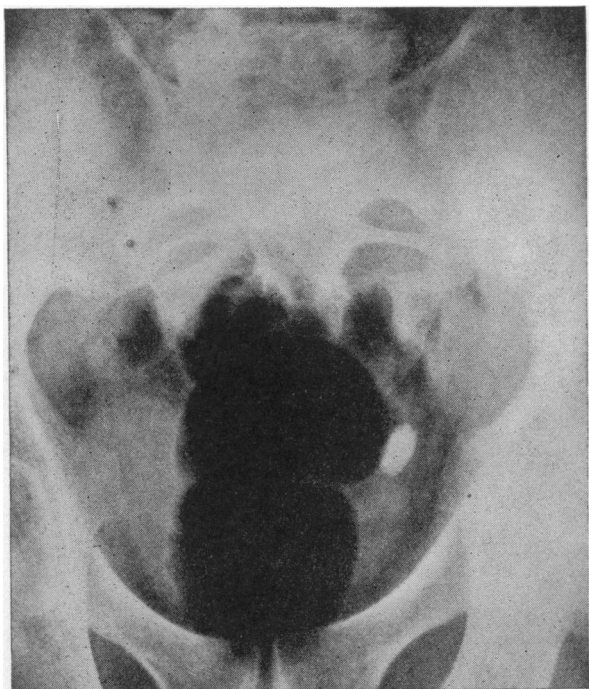


Fig. 1.—Case No. 1. Impacted stone lower ureter. Passed after enlarging ureteral meatus, and one dilatation of ureter below stone.

ney or spinal cord, and highly concentrated acid or alkaline urine are contributing causes, and should be corrected, in so far as possible, as a prophylaxis against the formation of other stones.

Primary ureteral calculi are formed in the kidney and pass into the ureter, where they may become lodged at any point, usually above a narrowing, or they may pass directly into the bladder. After being arrested in the ureter they usually increase in size, causing complete, partial, or intermittent obstruction. If a groove forms they may increase to considerable size without producing any symptoms or damage to the kidney. Unless there is free drainage of urine past the calculus, there will be some damage to the kidney, varying from slight dilatation of the renal pelvis to complete destruction from hydronephrosis or by invasion of the parenchyma by infection.

A very conservative attitude should be maintained while dealing with these apparently hopelessly destroyed kidneys, as they have remarkable regenerative powers after free urinary drainage has been established.

There have been some very large stones reported by Kretschmer, Goldman, and Bugbee. The largest in my small series was 12 by 4 centimeters in diameter.

DIAGNOSIS

The diagnosis can usually be made, although it is not always easy; and even when it appears obvious from the history and symptoms, a complete urologic study may be necessary and should always be done.

Pain of some variety is usually present and is typical when it radiates into the external genitalia. Microscopic blood is practically always found, with the exception of the anuria cases. There are

many conditions external to the urinary tract that may cause either hematuria or suppression. The x-ray is our greatest aid in establishing a positive diagnosis. If the ureter is entirely filled with the proper contrast media, even the non-opaque stones will usually be outlined. Intravenous urography has been a great aid, not only in establishing a diagnosis, but in determining the condition of the urinary tract above the stone. No great significance should be given to the entire absence of secreted opaque media if there has been a sudden complete block. As soon as the obstruction is removed they rapidly regain their normal function. Present-day writers, reviewing large series of cases, state that from 10 to 22 per cent cannot be demonstrated by the x-ray. A wax-tipped catheter is a great aid, and should always be used in doubtful cases.

There is a definite number of cases with typical symptoms, and a few red blood cells in the urine in which no calculus can be demonstrated. These are due to a mass of adherent crystals, which may be passed spontaneously or following the passage of a catheter. Phleboliths, calcified glands and various other opacities are readily identified and do not cause much confusion if opaque catheters are used and stereo films then made.

Air bubbles in the ureterogram are occasionally confused with non-opaque stones.

TREATMENT

The management of ureteral calculi should be highly individualized, and they should all be removed as speedily as all the factors warrant.

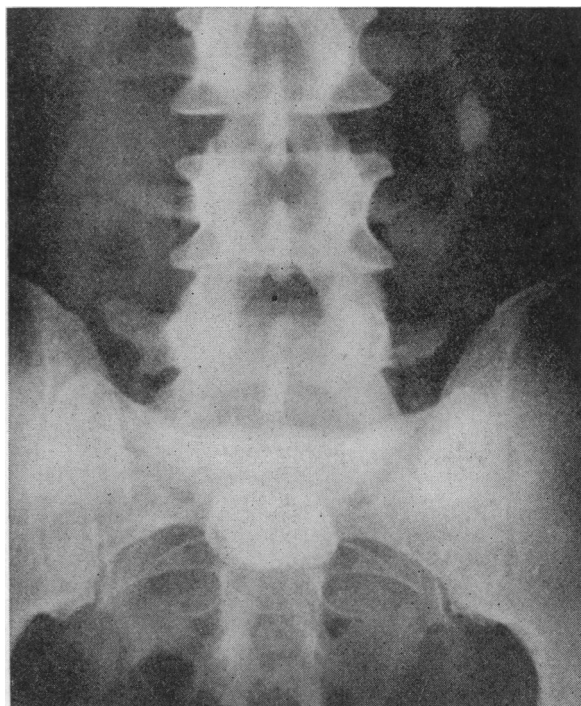


Fig. 2.—Case No. 2. Calcium oxylate stone upper right ureter. Impacted eight days. White blood cells 36,000. Constant vomiting. Five unsuccessful attempts at cystoscopic removal elsewhere. Ureterolithotomy through a lumbar incision liberated 60 cc. of purulent urine under pressure from the kidney pelvis. No sutures were placed in the ureter. No urinary drainage. Healed eight days.

Since Lewis introduced his stone dislodger there has been a continued parade of dilators, screws, bulbs, slings, crushing forceps, etc., to assist in the removal of ureteral stones. The better procedure is the use of the ordinary catheters and bougies, dilating the ureter, changing the position of the stone and, if possible, providing temporary drainage past the stone. The catheter or catheters should not be left in place too long. The enlargement of the ureteral orifices with surgical diathermy is often indicated and surprisingly large stones that have become lodged here will pass. The cystoscopic removal of calculi is ideal, and every effort should be made to relieve the patient this way when the size of the stone, the condition of the kidney, and the condition of the patient justify it. A note of warning, however, should be sounded as to the dangers of too prolonged attempts with this procedure. Conservatism must have, as its object, the welfare of the patient. From 50 to 90 per cent of ureteral stones have been reported as passing spontaneously or after some cystoscopic maneuver.

INDICATIONS FOR OPEN OPERATIONS

The indications for open operations are:

1. Stones obviously too large to pass.

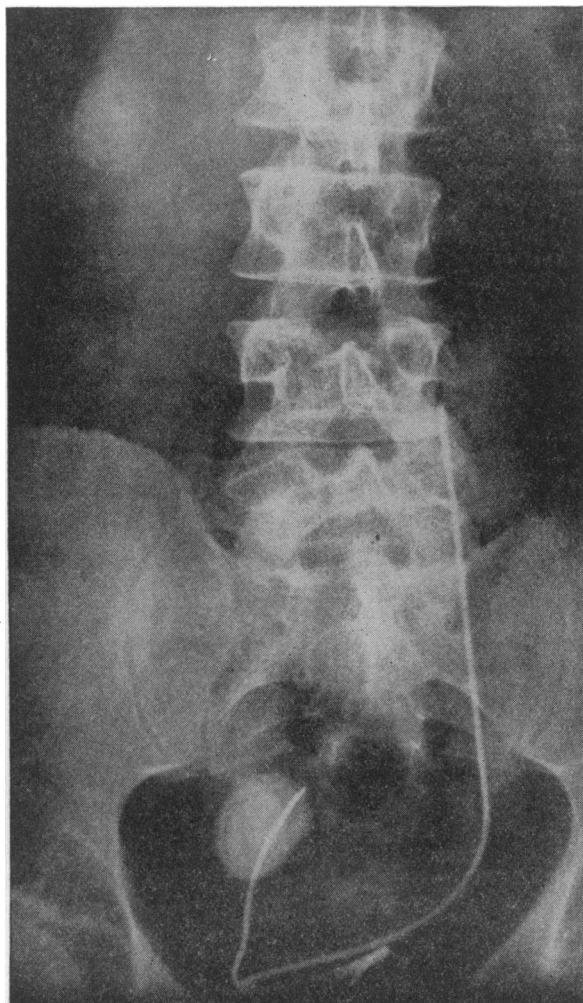


Fig. 3.—Case No. 3. A laminated calculus in the lower ureter and a similar calculus in the hydronephrotic kidney. The ureter was large enough to permit the easy passage of the ureteral stone to the kidney pelvis.



Fig. 4.—Case No. 4. A calculus twelve centimeters by four centimeters in diameter blocking the lower ureter. Young man of twenty-one with a history of severe abdominal cramps with nausea, vomiting and diarrhea, associated with limping at irregular intervals for twelve years. Ureteral calculus had not been suspected.

2. Failure to pass, after repeated cystoscopic procedures.
3. Anuria.
4. Severe infections of the kidney.
5. Impacted stones that cannot be moved or passed.

Peacock states that often the shape, rather than the size, is the determining factor.

TECHNIQUE

The operative removal of an impacted stone is fairly easy, as it will usually remain stationary while the patient is being anesthetized. Any movement will practically always be toward the kidney. For stones in the upper two-thirds of the ureter a lumbar approach is used. If in the lower third the mid-line incision is preferable, although some operators prefer the Gibson incision. Adequate drainage must be provided, preferably by soft tubing, and if necessary through a stab wound in the flank. This dependant drainage is especially indicated after any type of muscle splitting approach through the lateral abdominal wall. The incision in the ureter should be large enough to permit the easy removal of the calculus in one piece, and should always be done under direct vision. Profuse hemorrhage will result if one inadvertently removes a phlebolith.

No attempt is now made to close the ureter. If the ureter is entirely free from obstruction, it will rapidly heal. In my very limited experience wounds in the lower ureter have urinary drainage more often and longer than those of the upper ureter.

Ureteral calculi discovered during early pregnancy should be promptly removed. Those found during late pregnancy should be treated more conservatively.

During the past five years I have treated fifty-one private cases of ureteral calculi that were demonstrated by x-ray. There are twelve other cases of ureteral colic relieved by one dilatation in which no calculus could be demonstrated. These, I am sure, were caused by masses of adherent crystals, as the urine in each case was loaded with crystals or amorphous phosphates. In thirty-three cases the stones were passed following conservative treatment, nine being removed by various stone removers. Following the use of a metal corkscrew, one case developed a severe hemorrhage, filling the bladder with clots which were removed by way of the urethra, when the stone was found embedded in one of the clots. Twenty-four patients passed stones after being dilated from one to nine times, four requiring the enlargement of the ureteral orifice by surgical diathermy. There were eighteen open operations. Twelve ureterotomies, with two deaths from pulmonary emboli, both occurring on the twelfth postoperative day. Six nephrectomies, with no deaths: three because of hydronephrosis of long standing, and three because of multiple abscesses resulting from prolonged retention of infected urine in the kidney pelvis. One of these was removed at the time of operation, one three weeks postoperative, and the other one two months after the stone had been removed from the ureter. I would like to cite a few illustrations and unusual cases.

REPORT OF CASES

CASE 1.—Cystine calculus in the lower right ureter.

Indian boy. Age, eighteen months. Loss of weight and attacks of vomiting and crying for past six months. Many red blood cells; no white blood cells; and no infection in the urine.

CASE 2.—Calcium oxylate stone in the upper right ureter.

First attack of twenty-four hours' duration. Complete anuria. Gibson incision. Postoperative pulmonary emboli (three), with recovery. Insufficient drainage resulted in huge collections of pus in the flank, which were drained on the tenth and eighteenth postoperative days. Should have been drained by a stab wound in the flank.

CASE 3.—Calcium oxylate stone in the upper right ureter. Impacted eight days. White blood count, 36,000. Constant vomiting. Five unsuccessful attempts at cystoscopic removal elsewhere. Ureterolithotomy through a lumbar incision liberated 60 cubic centimeters of purulent urine under pressure from the kidney pelvis. No sutures were placed in the ureter. No urinary drainage. Healed in eight days.

CASE 4.—Impacted stone in the lower ureter. Passed after enlarging ureteral meatus, and one dilatation of ureter below the stone.

CASE 5.—Bilateral calculi in the intramural ureter. Many attempts at removal, after enlarging the ureteral openings unsuccessfully. Both stones removed through a suprapubic cystotomy wound. Healed in ten days. Died on twelfth postoperative day. Pulmonary emboli.

CASE 6.—Bilateral multiple calculi. Right nephrolithotomy five years previously. Has passed over fifty calculi

from both sides. N. P. H., 76. Total phthalein, only trace in two hours. Both ureteral orifices were enlarged. He now passes stones with little pain. The urinary infection has not yielded to treatment.

CASE 7.—Calculi in the lower ureter. Kidney removed elsewhere eighteen months previously. Continued to have colic, with blood and pus in his urine.

CASE 8.—The two x-rays were taken six months apart, and show the rapid growth of the phosphatic ureteral stone that was pushed back into the kidney pelvis during an attempt at cystoscopic removal.

CASE 9.—(a) Shows a small stone in the pelvis that remained the same size for three years. (b) Shows the same stone enlarged, and engaged in the ureter after the patient was on a very rigid stone-dissolving diet for one month.

CASE 10.—(a) Sinus tract injected with lipiodol solution. From this a diagnosis of a tuberculous lesion of the spine was made. (b) Injected with iopax, shows its connection with the kidney pelvis, and a large stone obstructing the lower ureter. The other kidney appears normal.

CASE 11.—A laminated calculus in the lower ureter, and a similar calculus in the hydronephrotic kidney. The ureter was large enough to permit the easy passage of the ureteral stone to the kidney pelvis.

CASE 12.—A calculus, 12 by 4 centimeters in diameter, blocking the lower ureter. Young man of twenty-one, with a history of severe abdominal cramps with nausea, vomiting and diarrhea, associated with limping at irregular intervals for twelve years. Ureteral calculus had not been suspected.

SUMMARY

1. Ureteral calculi are formed in the kidney. The actual cause is still unknown.

2. The prophylaxis to prevent a recurrence consists in (a) removing all urinary stasis and infection; (b) keeping the urine well diluted and changing its reaction; (c) a diet rich in vitamin A; (d) in cases of calcium oxylate stone, eliminating from the diet food containing oxylates.

3. Urography and the waxed-tipped catheter are diagnostic necessities.

4. Ureteral colic may be caused by masses of adherent crystals that cannot be demonstrated.

5. Conservatism must have as its object the welfare of the patient.

6. Repeated use of the ordinary catheters and bougies is preferable to the various stone removers, and is the treatment of choice in about 70 per cent of the cases.

7. The size of the stone, the size of the ureter, the condition of the kidney and the condition of the patient must be considered in determining how long we are justified in using conservative methods.

8. Free drainage must be provided. A stab wound to provide dependant drainage is occasionally indicated.

9. It is not necessary or advisable to close the incision in the ureter.

10. A small series of sixty-three cases are analyzed.

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DISCUSSION

BURNETT WRIGHT, M. D. (727 West Seventh Street, Los Angeles).—There is so much that is good and so little to disagree with in Doctor Gibbs' paper that it can be considered and referred to as a safe, sensible guide to the management of ureteral calculi. In this locality, where urinary stones are so common, and open operations, especially ureterotomy, are relatively frequent, it may be well to emphasize the fact that dangerous and occasionally fatal complications sometimes follow the surgical removal of impacted ureteral calculi. The author's two deaths from pulmonary emboli, in a series of eighteen ureterotomies with a mortality of 11 per cent, while uncommonly high, illustrate the point. In more than fifty ureterotomies for stone in the past fifteen years, I have, luckily, had but one pulmonary embolus, which Doctor Gibbs and I both remember all too well, since he was the unfortunate patient, and I was the terrified surgeon! That emboli may follow inadequate drainage and retroperitoneal suppuration after ureterotomy, is a conviction now firmly implanted in my mind, and is an additional argument in favor of suturing the ureter, especially in its lower third, where drains do not function as well as through a lumbar approach to the upper ureter. A certain percentage of sutured ureterotomies will heal per primum, while there is practically always some urinary leakage in those left open; often it is profuse and prolonged, and results in peri-ureteral scarring, and predisposes to coccal infection in the kidney, with subsequent stone formation, as pointed out by Kidd a number of years ago. We recently cut down on a ureter to remove a stone impacted at the site of a previous ureterotomy, and found two inches of the ureter imbedded in a dense mass of scar tissue that bound it firmly to the surrounding structures. This must have resulted from urinary leakage, after the first operation. We feel that it is especially important to suture dilated ureters that have to be opened. It is our opinion that postoperative stricture of the ureter will occur less frequently if the ureter is carefully and properly sutured after ureterotomy. For a number of years we have opened the ureter with a cataract knife and sutured it with needles and instruments used in eye surgery in an effort to avoid trauma to the edges of the incision, and to attain better approximation and healing. We recommend periodic examinations with intravenous urography and ureteral dilatations, when indicated, for all patients who have had a ureterotomy for stone, to ascertain and correct any tendency to postoperative stricture formation.

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A. A. KUTZMANN, M. D. (1930 Wilshire Boulevard, Los Angeles).—I would like to commend the author on his timely and common sense, conservative discourse on ureteral calculi, especially in the treatment outlined. In the present era of advancing urology and the bringing out of so many new mechanical ureteral-stone removers, we very often forget many good and time-tried procedures with simpler instruments. It is true that some of the new stone removers can be used to better advantage in the extreme lower ureter, but for general use through the entire course of the ureter the ureteral catheter is still the best. It is fraught with less danger in causing trauma, ureteral perforations, etc. We must exercise special care where there is suspected a pathologic ureter, resulting in obstruction, edema, brittleness, etc. The writer has enjoyed much success with calculi in the ureter, situated higher than 4 to 5 centimeters, by employing the use of several catheters, and leaving them indwelling for several days. As these catheters are being removed, the injection of either sterile olive oil or glycerin, or an equal combination of both, will tend to help a stone on its downward progress. Often the stone becomes enmeshed with the catheters and will come out with them.

I believe the figure of non-visualization, 10 to 20 per cent, is too high—5 to 10 per cent being more near the

usual run. Excellent modern x-ray equipment, and technique to bring out good tissue detail are responsible for this. The use of intravenous urography will enhance such studies still further. Occasionally with the patient in the throes of colic, or shortly thereafter, no opaque media will be excreted on the stricken side, but the kidney outline will stand out more than usual due to the apparent holding of the media in the renal parenchyma. The affected kidney is not functioning, even though there be no ureteral obstruction, as evidenced by cases with very tiny ureteral calculi, but having excruciating colic. The affected side apparently is in a type of "shock," leading to a suppression which may take from several hours to one or two days to cease; meanwhile the opposite kidney will function normally, as evidenced by a visible ureteropyelogram. This phenomenon has helped in diagnosing some cases with tiny calculi or urate stones not casting shadows in the plain x-ray plate. Further aid may occasionally be obtained from the x-ray by stereo pictures, lateral views and serial pictures.

Whenever possible a catheter should be passed up the ureter prior to operation and an x-ray exposure made. This will give the operator definite information as to the location of the calculus, and, furthermore, will keep it anchored in that location until removed.

In conclusion, I would like to stress conservatism in the management of ureteral calculi, since most of them will pass spontaneously or with aid of conservative instrumental manipulation. Doctor Gibbs has outlined very well the definite indication for the surgical removal of ureteral calculi.

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LIONEL P. PLAYER, M. D. (384 Post Street, San Francisco).—The essayist in his brief discussion of the etiology of urinary lithiasis aptly concludes with the usual phrase: "etiology not definitely known." It is generally conceded that urinary calculi are primarily renal in origin. Calculi may gravitate from the renal substance to the calyx, pelvis, the ureter and the bladder, or they may become arrested at any point along the urogenital tract, and cause symptoms in proportion to the degree of obstruction and irritation they produce.

This paper is concerned with ureteral lithiasis, its diagnosis, and treatment. On an average, 90 per cent of stones are demonstrable by x-ray and this average is somewhat increased by the intravenous or retrograde injection of a selected opaque media, which shows the comparative density between the calculus and media.

The author mentions the frequent necessity for full cystoscopic study in order intelligently to determine whether surgical or manipulative procedures are indicated. He stresses the danger of delaying surgery in favor of manipulative measures, and presents in concise form the indications for open operation. He might add to these, however, two more indications, namely, increasing hydro-nephrosis and diminishing renal function.

The various metal instruments for removing ureteral stones are dangerous, even in the hands of the most skilled urologists, and should be used only in selected cases. The simplest and best instrument for removing ureteral calculi is the ordinary ureteral catheter with its varied tip modifications. It may be left in the ureter either above or below the stone for the purpose of dilatation, and the various oils, diluted acids, etc., can be injected to facilitate the stone's expulsion.

The site of the incision in open surgery should be governed by the position of the ureteral stone, and x-ray should immediately precede the operation for obvious reasons.

In many instances I have refrained from suturing the incision in the ureter, and so far have had no reason for regret. Dependant drainage, I certainly agree, is highly important, but the drain should be close to and not in contact with the incision in the ureter.

In the after-treatment of the patient, dietary precautions and clearing up of urinary infection are important; but further investigation of the urinary tract for strictures and other abnormalities is of paramount importance.